

Appl. No. : 10/675,068
Filed : September 29, 2003

AMENDMENTS TO THE CLAIMS

Please amend the claims to read as follows.

Please cancel Claim 19 without prejudice.

- 1-19. (Canceled)
20. (Currently Amended) The surgical instrument of claim ~~19~~36, wherein the housing is concave about at least a portion of its long axis.
21. (Original) The surgical instrument of claim 20, wherein the housing is concave about at least a distal portion of its long axis.
22. (Currently Amended) The surgical instrument of claim ~~36~~19, wherein the housing is convex about at least a portion of its long axis.
23. (Original) The surgical instrument of claim 22, wherein the housing is convex about at least a distal portion of its long axis.
24. (Currently Amended) The surgical instrument of claim ~~36~~19, wherein the first opening is in an opening surface on the housing.
25. (Currently Amended) The surgical instrument of claim ~~36~~19, wherein the housing is curved along its long axis, to assist in placing the surgical instrument in the body of a patient.
26. (Currently Amended) The surgical instrument of claim ~~36~~19, wherein the blade is substantially flat.
27. (Previously Presented) The surgical instrument of claim 24, wherein the housing is curved along its long axis in a direction toward the opening surface.
28. (Currently Amended) The surgical instrument of claim ~~36~~19, further comprising at least one bearing retainer for reducing friction.
29. (Original) The surgical instrument of claim 28, wherein said at least one bearing retainer has at least one slot configured to transmit fluid toward a distal end of the instrument.
30. (Currently Amended) The surgical instrument of claim ~~36~~19, further comprising at least one fiberoptic in or on the housing, for transmission of at least one of a video signal and illumination light.
31. (Currently Amended) The surgical instrument of claim ~~36~~19, wherein the housing has at least a second opening at a distal end of the housing.

Appl. No. : 10/675,068
Filed : September 29, 2003

32. (Original) The surgical instrument of claim 30, further comprising at least two lenses coupled to the at least one fiberoptic.

33. (Original) The surgical instrument of claim 32, wherein at least one of the at least two lenses is disposed at a distal end of the housing, and another of the at least two lenses is disposed in proximity to the first opening in the housing.

34. (Currently Amended) The surgical instrument of claim ~~36~~19, further comprising a pump for pumping fluid through the surgical instrument.

35. (Original) The surgical instrument of claim 34, wherein the pump is mechanically coupled to the transmission.

36. (Currently Amended) A surgical instrument comprising:

a blade;

a housing in which the blade moves, the housing having a long axis;

a transmission that converts rotary motion to reciprocating, linear motion, wherein the transmission is coupled to the blade such that the blade moves reciprocally in the housing. The surgical instrument of claim 19, wherein the transmission comprisingcomprises:

two surfaces that are a substantially fixed distance apart;

a cam that rotates about a central axis, said central axis being at an angle to a plane extending between the two surfaces; and

the cam having a curvilinear body, the body having a nonuniform thickness, wherein the body continuously contacts the two surfaces as the cam rotates about the central axis, such that the two surfaces remain at the substantially fixed distance apart as they move linearly in response to the cam's rotation about the central axis;

a first opening in the housing through which a portion of the blade is exposed; and

a cutting surface on said exposed portion of the blade, said surface configured to perform at least one of grinding, filing, and cutting of tissue.

37. (Previously Presented) The surgical instrument of claim 36, wherein said cam's central axis is substantially parallel to a direction of the linear motion of the two surfaces.

Appl. No. : 10/675,068
Filed : September 29, 2003

38. (Previously Presented) The surgical instrument of claim 36, wherein said central axis is substantially perpendicular to the plane extending between the two surfaces.

39. (Previously Presented) The surgical instrument of claim 36, wherein the two surfaces move linearly back and forth in reciprocating motion in response to the cam's rotation about the central axis.

40. (Previously Presented) The surgical instrument of claim 36, wherein the curvilinear body has a shape comprising at least two toruses, the at least two toruses being partially superimposed, and each of said at least two toruses has a central axis, wherein the central axes of the at least two toruses are at an angle to each other.

41. (Previously Presented) The surgical instrument of claim 36, wherein at least one bearing comprises the two surfaces.

42. (Previously Presented) The surgical instrument of claim 41, wherein two bearings respectively comprise the two surfaces.

43. (Previously Presented) The surgical instrument of claim 36, wherein the curvilinear body is disposed at an angle to the central axis of the cam.

44. (Currently Amended) A surgical instrument comprising:

a blade;

a housing in which the blade moves, the housing having a long axis;

a transmission that converts rotary motion to reciprocating, linear motion,
wherein the transmission is coupled to the blade such that the blade moves
reciprocally in the housing. ~~The surgical instrument of claim 19, wherein the~~
transmission comprises:

two surfaces that are a substantially fixed distance apart;

rotation means that rotates about a central axis, said central axis
being at an angle to a plane extending between the two surfaces; and

the rotation means continuously contacting the two surfaces as the
rotation means rotates about the central axis, such that the two surfaces
remain at the substantially fixed distance apart as they move linearly in
response to the rotation means's rotation about the central axis;

a first opening in the housing through which a portion of the blade is
exposed; and

a cutting surface on said exposed portion of the blade, said surface configured to perform at least one of grinding, filing, and cutting of tissue.

45. (Previously Presented) The surgical instrument of claim 44, wherein said rotation means's central axis is substantially parallel to a direction of the linear motion of the two surfaces.

46. (Previously Presented) The surgical instrument of claim 44, wherein said central axis is substantially perpendicular to the plane extending between the two surfaces.

47. (Previously Presented) The surgical instrument of claim 44, wherein the two surfaces move linearly back and forth in reciprocating motion in response to the rotation means's rotation about the central axis.

48. (Previously Presented) The surgical instrument of claim 44, wherein at least one bearing comprises the two surfaces.

49. (Previously Presented) The surgical instrument of claim 48, wherein two bearings respectively comprise the two surfaces.

50. (Previously Presented) The surgical instrument of claim 44, wherein the rotation means has a shape comprising at least two toruses, the at least two toruses being partially superimposed, and each of said at least two toruses has a central axis, wherein the central axes of the at least two toruses are at an angle to each other.

51. (Previously Presented) The surgical instrument of claim 44, wherein the rotation means has a curvilinear body and the curvilinear body is disposed at an angle to the central axis of the rotation means.

52. (Currently Amended) A surgical instrument comprising:

a blade;

a housing in which the blade moves, the housing having a long axis;

a transmission that converts rotary motion to reciprocating, linear motion, wherein the transmission is coupled to the blade such that the blade moves reciprocally in the housing, The surgical instrument of claim 19, wherein the transmission comprises:

two surfaces that are a substantially fixed distance apart;

a cam that rotates about a central axis, said central axis being at an angle to a plane extending between the two surfaces; and

the cam having means for continuously contacting the two surfaces as the cam rotates about the central axis, such that the two surfaces remain at the substantially fixed distance apart as they move linearly in response to the cam's rotation about the central axis;

a first opening in the housing through which a portion of the blade is exposed; and

a cutting surface on said exposed portion of the blade, said surface configured to perform at least one of grinding, filing, and cutting of tissue.

53. (Previously Presented) The surgical instrument of claim 52, wherein said cam's central axis is substantially parallel to a direction of the linear motion of the two surfaces.

54. (Previously Presented) The surgical instrument of claim 52, wherein said central axis is substantially perpendicular to the plane extending between the two surfaces.

55. (Previously Presented) The surgical instrument of claim 52, wherein the two surfaces move linearly back and forth in reciprocating motion in response to the cam's rotation about the central axis.

56. (Previously Presented) The surgical instrument of claim 52, wherein the means for continuously contacting the two surfaces has a shape comprising at least two toruses, the at least two toruses being partially superimposed, and each of said at least two toruses has a central axis, wherein the central axes of the at least two toruses are at an angle to each other.

57. (Previously Presented) The surgical instrument of claim 52, wherein at least one bearing comprises the two surfaces.

58. (Previously Presented) The surgical instrument of claim 57, wherein two bearings respectively comprise the two surfaces.

59. (Previously Presented) The surgical instrument of claim 52, wherein the means for continuously contacting the two surfaces is disposed at an angle to the central axis of the cam.

60-63. (Canceled)

64. (Original) The surgical instrument of claim 34, wherein the pump comprises:

a fluid path;

two plungers configured to at least partially occlude said fluid path;

a cam configured to cause said two plungers to at least partially occlude said fluid path alternately; and

at least one check valve along said fluid path for reducing backflow of fluid within said fluid path.

65. (Original) The surgical instrument of claim 64, wherein the cam translates in a direction that is substantially perpendicular to a long axis of at least one of said two plungers.

66. (Previously Presented) The surgical instrument of claim 65, wherein the cam translates in a direction that is substantially perpendicular to a long axis of each of said two plungers.

67. (Original) The surgical instrument of claim 35, wherein the pump comprises:
a fluid path;
two plungers configured to at least partially occlude said fluid path;
a cam configured to cause said two plungers to at least partially occlude said fluid path alternatingly; and
at least one check valve along said fluid path for reducing backflow of fluid within said fluid path.

68. (Original) The surgical instrument of claim 67, wherein the cam translates in a direction that is substantially perpendicular to a long axis of each of said two plungers.

69. (Currently Amended) The surgical instrument of claim 3619, further comprising at least one opening in the exposed portion of the blade, for transmitting fluid.

70. (Currently Amended) The surgical instrument of claim 3619, wherein the cutting surface comprises an abrasive material.

71. (Currently Amended) The surgical instrument of claim 3619, wherein the cutting surfaces comprises diamond.

72. (Currently Amended) The surgical instrument of claim 3619, wherein the blade comprises stainless steel.

73. (Currently Amended) The surgical instrument of claim 3619, further comprising a handpiece coupled to the housing.

74. (Currently Amended) The surgical instrument of claim 3619, further comprising a video camera.

75. (Original) The surgical instrument of claim 74, wherein the camera is configured to couple with a fiberoptic that extends to a distal end of the housing.

Appl. No. : **10/675,068**
Filed : **September 29, 2003**

76. (Original) The surgical instrument of claim 73, wherein a video camera is located in the handpiece.

77. (Original) The surgical instrument of claim 76, further comprising a watertight seal in the handpiece.

78. (Original) The surgical instrument of claim 77, wherein the handpiece is configured to contain the video camera in a chamber such that the watertight seal reduces or prevents ingress of at least one of water and bacteria from outside the handpiece into the chamber containing the video camera in the handpiece.

79. (Original) The surgical instrument of claim 73, further comprising a motor in the handpiece, said motor configured to power the rotary motion.

80. (Original) The surgical instrument of claim 79, wherein said motor comprises a gas turbine.

81. (Currently Amended) The surgical instrument of claim ~~36~~19, further comprising a cord configured to couple to a proximal end of the surgical instrument, said cord comprising at least one of a fiberoptic, an electrical line, an irrigation channel, a suction line, and a gas tube for powering a gas turbine motor in the surgical instrument.

82-105. (Canceled)

106. (Previously Presented) A surgical instrument, comprising

a housing having a longitudinal axis;

a blade assembly configured to oscillate linearly relative to the housing in a direction generally parallel to the longitudinal axis, the blade assembly comprising a blade having a cutting surface;

a rotary shaft; and

a transmission configured to convert rotation of the rotary shaft into oscillating linear movement of the blade assembly;

wherein the transmission comprises a torus-like shape disposed on the rotary shaft, the torus-like shape having a central axis that is angled relative to an axis of the rotary shaft.

107. (Previously Presented) The surgical instrument of Claim 106, wherein the transmission additionally comprises opposed bearing surfaces that are a substantially fixed distance apart.

Appl. No. : **10/675,068**
Filed : **September 29, 2003**

108. (Previously Presented) The surgical instrument of Claim 107, wherein the torus-like shape has a circumferential portion that fits between the opposed bearing surfaces.

109. (Previously Presented) The surgical instrument of Claim 108, wherein a thickness of the circumferential portion varies about the circumference.

110. (Previously Presented) The surgical instrument of Claim 106, wherein the torus-like shape comprises at least two toruses that are partially superimposed, the at least two toruses having central axes that are angled relative to one another.

Please add the following new claims.

111. (New) The surgical instrument of Claim 110, wherein the torus-like shape has a circumferential portion, and a thickness of the circumferential portion varies about the circumference.

112. (New) The surgical instrument of Claim 106, wherein the housing has an opening through which a portion of the blade is exposed.

113. (New) The surgical instrument of Claim 112, wherein the housing shields the blade from access except at the opening.

114. (New) The surgical instrument of Claim 112 additionally comprising at least one opening in the exposed portion of the blade, for transmitting fluid.

115. (New) The surgical instrument of Claim 114 further comprising a pump for pumping fluid through the surgical instrument.

116. (New) The surgical instrument of Claim 112, wherein the blade is substantially flat.

117. (New) The surgical instrument of Claim 106 further comprising a pump for pumping fluid through the surgical instrument.